REMARKS

Claims 1–16 are pending in the present application. Claims 3 – 5, 7 - 14 and 16 have been withdrawn, Claim 1 has been amended, leaving Claims 1 – 2, 6 and 15 for consideration upon entry of the present response. Reconsideration and allowance of the claims is respectfully requested in view of the following remarks.

Claim 1 has been amended to better define the invention. Support for the amendment to Claim 1 can be found at least in page 3, lines 24 – 34.

Claim Rejections Under 35 U.S.C. § 103 (a)

Claims 1, 2, 6 and 15 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over U.S. Patent No. 6,875,619 to Blackburn in view of U.S. Patent Application No. 20020054835 to Robotti et al. (Robotti).

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art; that the prior art relied upon, or knowledge generally available in the art at the time of the invention, must provide some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988).

Claim 1 is directed to a PCR (polymerase chain reaction) device comprising an inlet through which a biochemical fluid is injected; an outlet through which the biochemical fluid is discharged; a PCR channel positioned between the inlet and the outlet; first and second micro-valves, which control opening and closing of the inlet and the outlet; and a sol-gel transformable material, which transforms from a sol state into a gel state at a temperature lower than DNA denaturation temperature, annealing temperature and extension temperature and higher than room temperature; the sol-gel material transformable material being positioned in the first and second micro-valves; the sol-gel material being operative to control the opening and closing of the first and second micro-valves.

Blackburn is directed to a variety of microfluidic devices with configurations that include the use of biochannels or microchannels comprising arrays of capture binding ligands to capture target analytes in samples. (see Abstract) Blackburn teaches that hydrogels and gel pads can be used to bind the biological molecules. (see Col. 24, lines 34 – 36) Blackburn teaches that the gel pads are permanent gels that are crosslinked. (see Col. 24, lines 40 – 65; especially see line 51) More specifically Blackburn teaches polyacrylamide hydrogels that have a cross-linking agent. (Col. 24, lines 51)

Robotti teaches micro-fluid devices and methods for their uses. (see Abstract) Robotti teaches that the device comprises at least one micro-valve comprising a phase reversible material e.g., a reversible gel that reversibly changes its state in response to an applied stimulus, e.g., a thermoreversible gel. (see Abstract) Robotti does not teach that the channel disposed between micro-valves can be used for polymerase chain reactions. Robotti also does not teach a material that transforms from a sol state into a gel state at a temperature lower than DNA denaturation temperature, annealing temperature and extension temperature and higher than room temperature.

Applicants believe that there is no motivation to combine references. In the first instance Blackburn teaches away from Robotti. Blackburn teaches hydrogels that are permanently cross-linked and that are not thermoreversible. Robotti, in contrast, teaches thermoreversible gels. One of ordinary skill in the art upon reading Blackburn and discovering its teaching of permanently cross-linked hydrogels would not be motivated to use the thermoreversible gels of Robotti.

Secondly, Blackburn does not teach using its hydrogels to control the opening and closing of the microvalves. The hydrogels of Blackburn are solely for binding materials introduced into the channel. Robotti and the claimed invention in contrast are directed to using microvalves that are controlled by a thermally reversible gel.

Blackburn does not teach microvalves as contended by the Examiner. Fluid control devices 32 and 34 in Figure 8 of Blackburn can either be microfluidic pumps (see Col. 54, lines 65 – 67), examples of which can be electroosmotic pumping systems. Alternatively, the fluid control systems can comprise capillary stop valves. (Col. 55,

lines 4 – 6) In the capillary stop valve approach, a discontinuity in the channel, such as an abrupt decrease in channel cross-section or the presence of a hydrophobic region, substantially prevents the passage of fluid until a sufficiently high pressure is applied. (Col. 55, lines 6 – 10) Blackburn in teaching a capillary stop valve that has a discontinuity in the channel teaches away from using a gel that is thermoreversible.

One of ordinary skill in the art upon reading of the capillary stop valve would be dissuaded from replacing it with a microvalve whose functions are manipulated by a thermally reversible gel. Since Blackburn teaches away from Robotti, there is no motivation to combine references and the Applicants believe that the Examiner has not made a *prima facie* case of obviousness over Blackburn in view of Robotti. Applicants respectfully request a withdrawal of the rejection over Blackburn in view of Robotti.

Conclusion

In view of the above amendments and remarks, it is respectfully submitted that this application is now in an allowable condition. Reconsideration and subsequent allowance are therefore courteously requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

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